TMF

THE MAC FLYER-For Greater Safety in MAC Air Operations

October 1987

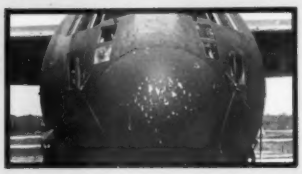
Comments from the new MAC Director of Safety, page 3

TMF

THE MAC FLYER-For Greater Safety in MAC Air Operations

October 1987 MACSP 127-5 VOL XXXIV NO. 10

page 4



page 8

FEATURES

3 . . . On Safety
Senior officers speak up!

4 Birdbrain
Birds and humans have a lot in common.

8 Minimum Separation—Maximum Danger
Judgment is the key.

11 The Final Few . . .
Are the most important.

13 The Right Choice
Evaluate all indications.

15 The Hazard of Being Outstanding
It's tough to keep it up.

16 Avian Advice
Listen once more . . .

20 Safety Workhorse—The FSO
You can't separate safety disciplines.

23 High Atitude Chart
The latest thing.

24 Unusual Recovery Techniques
When all else fails.

30 Time's Here . . .
Sharpen your pencils once again.

DEPARTMENTS

14 Excellence In Airmanship
27 Flying-Hour Milestones
28 Quick Stoppers
31 After Deadlines

Gen. Duane H. Cassidy — Commander in Chief
Brig. Gen. Floyd E. Hargrove — Inspector General
Col. Thomas M. James — Director of Safety

Maj. Thomas C. Weinzierl — Supervising Editor
Capt. Donald L. Rosenberry — Associate Editor
Mrs. Frances A. Caldwell — Writer/Editor
Mr. Tom O'Laughlin — Art Director

The MAC Flyer is published by the Director of Safety, Military Airlift Command. The contents are informative and not regulatory or directive. Names of people and places in mishap stories are representiative and not necessarily of the aircraft or equipment involved. Information in any article may not be construed as incriminating under Article 31, UCMJ.

Contributions, comments and criticisms are welcome. Write: *The MAC Flyer* HQ MAC/IGFE, Scott AFB, IL 62225-5101, or Autovon 576-3534. The editors reserve the right to make any editorial changes in manuscripts which they believe will improve the material without altering the intended meaning.

Subscriptions are available from: The Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes of address for subscriptions mailing should be sent to GPO. Give both old and new addresses, including zip codes. USAF Active and Air Reserve Forces units establish requirements for the magazine through their publication distributor (DAPD). Other U.S. Military units should consult administrative directives. *The MAC Flyer* is published at an approximate ratio of one magazine for every five MAC aircrew members, and one for every twenty MAC Support personnel. Distribution X: OPR: HQ MAC/IGFE ISSN 0024-788X.

Col. Thomas M. James assumed duties as Director of Safety in July 87. He was Deputy Director since reporting to HQ MAC from HQ AFISC in May 85. Colonel James has served as C-130 pilot, AC, and flight examiner at Dyess, CCK, and Clark. He's also flown T-29s and T-39s and has held a variety of staff positions at wing, NAF, HQ AFISC, and HQ MAC.

(Editor's Note: You'll meet senior MAC commanders and staffers on this page in future *TMFs*. We're asking our senior leaders (HQ MAC, NAF, and ALD general officers, wing commanders, and senior operations, logistics, and safety officers) to share their philosophy and thoughts on safety. Col. Thomas M. James, Director of Safety, HQ MAC, introduces our "signature page" and shares some of his thoughts on safety.

In the last couple of months, you've read (if you're a faithful *TMF* and base paper reader) a couple of excellent articles about safety—specifically, answering the question, "Is safety paramount?" The answer must be emphatically NO! Safety is not the *most* important consideration. If safety were the most important aspect of our operation, we could achieve flight safety simply by parking our airplanes. Our most important consideration is *mission*.

Since we determined the upper limit of safety application—parking our airplanes— let's explore the other (lower) limit: *NO* safety at all. Imagine if you will, an operation without checklists, upgrade requirements, minimum proficiency requirements, checkrides, air traffic control procedures, standard cockpits, and few, if any, regulations, directives, or flight crew procedures. From what I've read, that's about what flight operations were like in WW I and early WW II, although I doubt those folks considered themselves totally unsafe.

But what's that have to do with safety? Everything. Our relentless pursuit of flight safety has affected every aspect of aviation. Given the man-machine-environment equation involved in most accidents, we've made remarkable progress in every area. Our present design, maintenance, support, operations, and aircrew procedures are written in blood. We've done so well in most areas that the "MAN" part of the equation is really getting our attention. Human factors is our weak area, and that's where you, the crewmember comes in.

You must apply safety. But what is safety and where does it fit in our operations? Safety is simply an analysis of acceptable risk somewhere between the limits described above. Obviously, when risk is high (thunderstorms overhead) we delay or cancel missions. Likewise, we ground airplanes with known or suspected structural/component deficiencies. You should evaluate every facet of each flight, including environment, machine, and capability (individual and crew) to determine a safe course of action. Unfortunately, this is not an easy process. And, in my opinion, crewmembers frequently get distracted from the safe-not safe-analysis by their perception of the relative importance of the immediate flight. Ever heard, "I won't take this airplane for a local" implying "but I would for an important mission" (possibly with greater risk)? Or how about, "Our commander talks out of both sides of his mouth. He talks about safety, then wants us to take this airplane with the XXX written up." Sure, we've all heard or said that. Obviously, the commander has already made his risk assessment. It may not be comforting, but I can tell you the great majority of logistics-caused mishaps over the last few years were not "known" or "written up" problems. Logistics problems that cause mishaps are usually problems neither logistics folks (either at depot or local level) nor operations folks (commanders and crews) are aware of. The message here is that we've done a good job analyzing and managing known discrepancies. The loggies are constantly working the unknowns through an exhaustive process of data gathering, analysis, inspection, and repair. They are doing well and getting better.

Our mishap rates indicate that we operators, on the other hand, are not doing quite as well decreasing "operations factor" mishaps; over 80 percent of our mishaps are operations factor, or simply aircrew human error. *You* must develop a safety attitude. Do a safety risk analysis while you plan your flight and during flight. When the mission is over, critique yourself and learn from your mistakes. *Mission is our most important consideration. Safety is a close second. What you learn is experience. How well you apply what you learn is maturity.*

BIRDBRAIN

By Capt. Leonard M. Cohen
Vandenberg AFB, California

Hawk gathered his gear and headed out to meet his student. He filled his lungs with the crisp, fall air as he looked up at a beautiful day to fly, made all the better by Hawk's recent upgrade to instructor.

He'd worked hard, putting in long hours studying the books and polishing his already exemplary flying skills. And it had been worth it. There was nothing quite like the feeling Hawk experienced when he helped someone become a better flyer. He thought back to the first time he had flown, to the day he had finally left the ground far behind and soared in the company of eagles.

"Good morning, sir."

Hawk's thoughts returned to the present as he turned to face his student. It was Jake.

"I'm ready and willing," said Jake. "Let's kick the fires and light the tires . . . er, or whatever it is they say."

Hawk winced. Students were always butchering the special language of flying. They were in such a hurry to become part of the flying fraternity, they tried to sound like them, even if they felt awk-

HONORABLE MENTION
1987 MAC FLIGHT SAFETY WRITING CONTEST

ward with the phrases.

"We'll be ready to take off as soon as I look through your training records. Since I haven't flown with you before, I want to see what you need to work on," Hawk said.

"You're wasting your time, sir," chirped Jake. "I'm sure you'll find absolutely no problems. I've been 'sierra motel' on all my training flights."

Hawk smiled in spite of himself. As he feathered through the files, he remembered now what Major Byrd, another instructor, had said about Jake: "Jake's the best student I've ever flown with. He can fly as well as most instructors at the school. The only problem is he's about as receptive to learning from one's experience as Dirty Harry would be getting slapped around by the tooth fairy."

Jake thought he had to go out and learn everything on his own. With his superior flying abilities, he'd gotten away with it so far. For Jake, limitations served only as the starting point for further exploration.

Hawk finally found Jake's records and began to read. Jake was right. There wasn't a hint of problems with his flying. Yet, here and there, when Hawk read between the lines, he got the feeling something wasn't quite right. He couldn't put his finger on exactly what it was, but it was there, in the subtle language of the training folder. Hawk was left with the impression Jake's instructors had all been very impressed with Jake's flying, but not with anything else.

"It looks like this is your last flight before your checkride," Hawk said. "Is there anything in particular you'd like to work on?"

"No, sir. This stuff's a piece of pie."

This kid is too much, Hawk thought. "Well, I'll tell you what. We'll do a little low-level formation along Alpha route. I'll take lead and you can follow along."

"Roger-Wilco," said Jake.

"Come on, hotshot. Let's go fly," said Hawk.

***

Maj. Jim Tatum was excited. He didn't get that way very often, but there was something about doing 400 knots 200 ft off the ground that got his adrenaline flowing.

"What's up, Don?" Major Tatum asked as his WSO walked into the briefing room. Maj. Don Banks rubbed his eyes and sat down heavily.

"Not much, except you and me, Jim," he said.

"You ready for our low-level work today?" asked Tatum.

"I was born ready."

Major Tatum smiled. "I don't have to tell you it's going to be a little more hairy out there today than usual. When we're on the deck, there's not much room for error."

"Yeah, just don't hiccough and fly us underground," said Banks.

"I'm sure not planning on it," said Tatum. "But then, you can't plan on everything. Make sure you give your egress equipment a good looking over just like you always do."

Major Tatum pressed on with the aircrew briefing, covering each item clearly and completely. He then went over every inch of the low-level route along which he would pilot his F-4. When he was finished, he grabbed his gear and looked Major Banks straight in the eye. "Let's go fly," he said.

***

Jake's preflight procedures were passable. He wasn't as thorough as Hawk, but then he didn't have the experience Hawk had. Having flown for most of his life, Hawk was familiar with many mishaps which could have been prevented on the ground with a good preflight.

Takeoff and climbout were uneventful. Hawk headed for Alpha. It was a fairly challenging route, depending upon how the leader treated his wingman. Hawk was going to test Jake some. After all, he was only one checkride away from graduation.

Hawk banked hard to the left and descended. Looking back over his shoulder, he saw Jake hanging right with him. "Good job, junior birdman," Hawk said.

"I was born to fly, sir."

"Aren't we all, son," said Hawk, pushing his airspeed up. The kid was good, no doubt about it.

***

"Feels smooth as glass today, don't it?"

"Sure does, Don," said Major Tatum. "Of course, that might be attributed to the pilot's perfect hands."

"Or perfect weather," said the WSO. "I favor the weather theory, myself."

. . . You don't think I'd break the rules, do you? . . .

Tatum grinned. They'd been flying for nearly thirty minutes. Low-level for the past ten. And everything had been perfect. On days like this, Tatum thought, I don't know why they give me flight pay. I ought to be paying *them.*

***

After a half-hour's work, Hawk asked Jake what he wanted to do for the rest of their flight. He had flown flawlessly so far.

"Well, sir, on my last solo I was practicing some new low-level stall recovery techniques," Jake said. "I'd like to polish them, if you don't mind."

Hawk raised an eyebrow. "What do you mean 'new' techniques? The Dash One contains all approved procedures for stall recovery."

"Yeah, I know. But those are probably based upon something an engineer flying a desk came up with. I don't like to rely on theory myself. I think experience is the best teacher, don't you, sir?"

Hawk could hardly believe his ears. "Look, Jake, you may think you're the best flyer to ever hit the skies, but that doesn't allow you to deviate from established procedures. For your sake, I think I'm going to recommend you receive some more training prior to your checkride."

"Wait a minute, sir. I was just kidding," said Jake. "You don't think I'd break the rules, do you?"

Hawk wasn't so sure. Unauthorized low-level stall recoveries sounded like something Jake would try. He really should write him up, but as it was . . . . The kid hadn't broken any rules that Hawk new about. And he did fly well. What the heck. It'll work out all right, he thought.

"Sir, could I fly some lead?" Jake asked, a smile on his face. "I'd like to see what you've got, now that you've wrung me out."

"Sure, why not," said Hawk. "Just keep it under control."

Jake was just like every other student in at least one way—he wanted to see what his instructor "had." Competition wasn't a bad thing, as long as it wasn't allowed to get out of hand.

Jake headed back down into Alpha. He was taking it nice and easy, displaying good wingman consideration. Hawk was surprised. He thought the kid would rock-and-roll him. Then Hawk realized what was happening.

"Hey, pick up the airspeed, Jake. You're too slow."

Jake continued to slow down.

"Come on, featherhead, you're gonna stall." Hawk was beginning to feel uncomfortable with his own airspeed.

"Watch this, sir," Jake said, pointing his nose still higher into the sky. He stalled. Hawk flew down beside him. Using a maneuver Hawk had never seen before, Jake snapped his nose back down toward the ground while rolling inverted and picked up speed like a rocket. He disappeared from view in a matter of seconds.

"Jake, come in, over. Jake, come in," Hawk said.

"I'm okay, sir. I'm over here behind you."

Hawk made a 180-degree turn and got a visual on his student. He felt rage and relief at the same time.

"See, sir," said Jake. "There are more ways to skin a cat than people might think."

"We'll see about who gets skinned when we get back to base. Right now, you'd best join-up on my wing. I show you in prohibited airspace."

"So my recovery carried me a little off-course. It was still amazing, wasn't it, sir?"

Hawk turned back toward home, shaking his head. He waited for the kid to call "two's in."

***

"What the hell was that, Don?" asked Major Tatum.

"I don't know, but it wasn't your imagination. I felt it, too," said the WSO.

There had only been a slight bump, but anything out of the ordinary on a low-level run was cause for concern. Tatum was already pulling back on the stick when the number 1 engine fire light illuminated.

"We've got a fire in number 1." The pilot's voice was surprisingly calm and businesslike.

"Number 2 is losing power, too, Jim." The emergency panel lit up like a Christmas tree.

"Looks like we've lost both engines, Don. Prepare for ejection." Tatum zoomed the aircraft to a safe altitude and the WSO initiated a rear cockpit dual sequenced ejection by pulling the lower ejection handle.

***

Hawk didn't know what had happened at first. He remembered Jake squawking, "Emergency!" and then a wind blast flipped him upside down and nearly tore his wings off. When he regained control, he looked up and found himself with a bird's eye view of the backside of a rapidly rising airplane. There were feathers fluttering all around as well. *Jake's feathers.*

***

Major Tatum had managed to get off a "Mayday" call prior to ejection, so he and Major Banks were picked up in no time. Their helicopter flight back to base wasn't nearly as exciting as their low-level flight had been, but neither of them complained.

***

The accident investigation revealed Jake had been ingested into the left engine of an F-4. There wasn't enough left of him for even one McNuggett. The mishap report stated the Class A could have been avoided had Jake not deviated from the Bird Ops approved low-level route during his stall recovery. Of course, he shouldn't have been practicing a stall recovery in the first place.

Hawk was administratively downgraded from instructor to early-bird, and though he upgraded again later, even moving up to stan/eval eventually, he never made bird colonel. The memory of the mishap followed him for the rest of his life.

***

The club was really hopping. Over in one corner, a local country-western band was just getting started, the lead singer cocking his cowboy hat back a notch and pressing his snuff-stained lips right up against the microphone. "Y'all are in for a down-home, foot-stomping, hand-clapping, partner-hugging hoedown tonight," he said.

Across the room, a small crowd was gathered around two guys doing a lot of talking with their hands. They were in flight suits, topped off with bright yellow checkered scarves. "There I was, suspended from my chute, floating down like a feather. I saw the fireball when our plane went in. Don," Major Tatum said, pointing a half-empty beer bottle at his WSO, "was about fifty yards away, screaming his fool head off."

"I was trying to find out if you were all right," said Don Banks. "I guess I should've been more concerned about the bird."

Tatum smiled, "Yeah, we didn't know at the time we'd had a birdstrike. Everything happened so quickly, ya' know. Anyway, it turns out we sucked a bird into the left engine, which then threw some blades into the right engine, and that's all she wrote. We got away with a few bruises, a destroyed aircraft, and a war story. At least we were luckier than the bird."

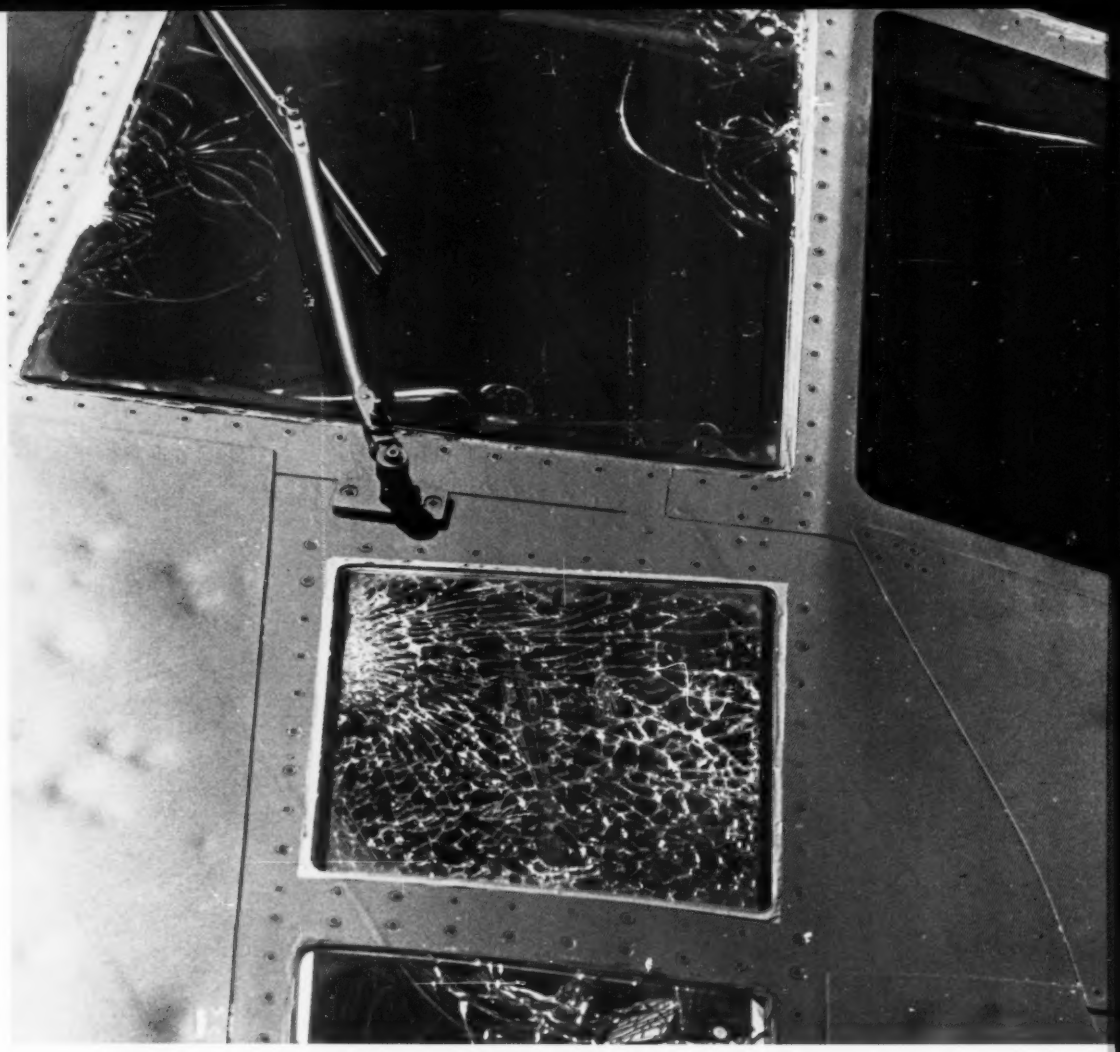
"Yeah," said Major Banks, rubbing his chin. "Can you imagine what it'd be like if birds had to go through flight school like people do? What a lark!"

"Ha, ha," Tatum said. "If they do have flight training, the bird we hit should have had his wings taken away for failing to practice see-and-avoid."

"You're right, Jim. He must have been a real birdbrain."

Both men laughed the laugh of men who were glad just to be alive.

Captain Cohen, an 1982 OTS Graduate is presently attending Wake Forest University School of Law, under the Air Force Funded Legal Education Program. Prior to that, Captain Cohen was an UH-1N instructor pilot at Vandenberg AFB, California.



Miminum Separation —Maximum Danger

Hail is still and always will be a hazard.

"GOOD MORNING, GENTLEMEN. I'M CAPT. MACKENZIE, AND WE'RE HERE TODAY TO BRIEF OUR RECENT C-130 MISHAP. THE C-130 ENCOUNTERED HAIL WHILE OPERATING AT 10,000 FT DURING AN OVERWATER NAVIGATION TRAINING SORTIE.

WEATHER FORECAST FOR THEIR FLIGHT AREA INCLUDED ISOLATED

THUNDERSTORMS WITH MAXIMUM TOPS TO 45,000 FT. A WEATHER ADVISORY DEPICTED AN ORANGE AREA ALONG THE COASTLINE ADJACENT TO THEIR FLIGHT AREA. ORANGE INDICATES POTENTIAL FOR THUNDERSTORMS WITH MAXIMUM WIND GUSTS OF 35 KNOTS OR LESS AND HAIL LESS THAN ½ INCH.

TWENTY-TWO MINUTES AFTER THE CREW RECEIVED THEIR WEATHER BRIEFING, THE ORANGE AREA WAS UPGRADED TO BLUE, INDICATING POTENTIAL FOR SEVERE THUNDERSTORMS WITH MAXIMUM WIND GUSTS OF 50 KNOTS OR GREATER AND HAIL 3/4-INCH OR LARGER. A LARGE PORTION OF THE CREW'S FLIGHT PLAN FELL WITHIN THIS AREA.

ENROUTE, THE CREW DID NOT REQUEST A PMSV WEATHER UPDATE BECAUSE ENROUTE WEATHER WAS AS FORECAST. THE SIGMET UPDATE WAS AVAILABLE FROM FLIGHT SERVICE AND WAS BROADCAST ON SEVERAL VOR FREQUENCIES, BUT THE CREW DID NOT RECEIVE IT.

CENTER ALERTED THE CREW TO WEATHER 30 NM DIRECTLY AHEAD AND CLEARED THEM TO DEVIATE AS NECESSARY FOR AVOIDANCE.

THE PILOT'S REPEATER SCOPE WAS NOT OPERATING AND THE CREW RELIED SOLELY ON THE NAVIGATOR FOR THUNDERSTORM AVOIDANCE USING RADAR.

THE NAVIGATOR OBSERVED WEATHER AHEAD AND BELIEVED THE AIRPLANE WOULD MAINTAIN THE REQUIRED 10 NM SEPARATION. HE BEGAN A CELESTIAL OBSERVATION WHILE MONITORING RADAR.

AFTER RETURNING TO HIS SEAT, HE PREPARED AN INITIAL 20-DEGREE HEADING CHANGE TO INSURE 10 NM CLEARANCE.

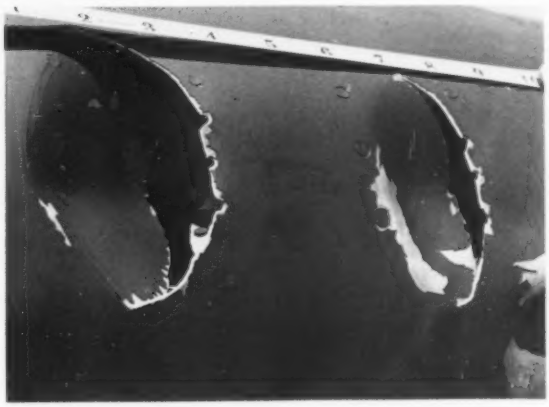
THE AIRPLANE ENCOUNTERED HAIL AND SEVERE TURBULENCE BEFORE THE NAVIGATOR COULD DIRECT THE HEADING CHANGE. THERE WAS NO TURBULENCE OR ICING PRIOR TO THE ENCOUNTER. THE AIRPLANE HAD 10 NM SEPARATION FROM THE CELL ON THE *DOWNWIND* SIDE WHEN STRUCK BY HAIL.

SLIDE—AIRPLANE DAMAGE—RADOME

A CLOSE-UP OF THE RADOME SHOWS NUMEROUS HAIL STRIKES. MULTIPLE IMPACTS OCCURRED ON THE COCKPIT AREA, CRACKING FOUR WINDOWS.

SLIDE—AIRPLANE DAMAGE—LEADING EDGE

AS THESE INDENTATIONS PROVE, THE AIRPLANE ENCOUNTERED HAIL OF AT LEAST BASEBALL SIZE. THE RIGHT WING LEADING EDGE RECEIVED DENTS AND CRACKS APPROXIMATELY EVERY 4 INCHES. THE LARGEST HOLE WAS 3 AND ½ INCHES IN DIAMETER.



THERE WERE HOLES AND CRACKS IN THE VERTICAL STABILIZER LEADING EDGE, A DESTROYED ANTI-COLLISION LIGHT, AND A DENTED HF ANTENNA MOUNT.

SLIDE—LESSONS LEARNED

WE CAN ALL BENEFIT FROM SEVERAL LESSONS RE-LEARNED IN THIS MISHAP.

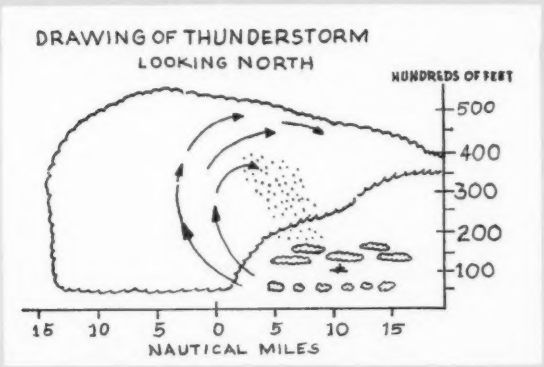
MAC 55-SERIES REGULATIONS SPECIFY 20, 10, 5 NM THUNDERSTORM AVOIDANCE CRITERIA. THESE DISTANCES REFLECT MINIMUM SEPARATION ALLOWED AND PROVIDE ADEQUATE CLEARANCE IN MOST CASES. STORM SEVERITY AND CIRCUMSTANCES INVOLVED MAY WARRANT MORE SEPARATION. EXPANDED GUIDANCE IS CONTAINED IN AFM 51-12, *WEATHER FOR AIRCREWS*. IN THIS CASE, THE AIRCREW BELIEVED 10 NM WAS ENOUGH.

DAMAGE SHOWN ON PREVIOUS SLIDES VIVIDLY ILLUSTRATES HAIL IS A SIGNIFICANT HAZARD WHEN FLYING NEAR THUNDERSTORMS AND, AS THIS MISHAP ILLUSTRATES, IS NOT STRICTLY A SUMMERTIME PHENOMENON. IT FREQUENTLY OCCURS IN MATURE CELLS THAT HAVE STRONG UPDRAFTS.

AS A RULE, THE LARGER THE STORM, THE GREATER THE PROBABILITY IT WILL CONTAIN HAIL. THEREFORE, APPROACH SEVERE THUNDERSTORMS WITH EXTRA CAUTION.

SLIDE—THUNDERSTORM PROFILE

HAIL HAS BEEN ENCOUNTERED AS HIGH AS 45,000 FT IN CLEAR AIR AND UP TO *20 MILES DOWNWIND* FROM THE STORM CORE. THE PROBABILITY OF ENCOUNTERING HAIL DOWNWIND OF A SEVERE THUNDERSTORM, ESPECIALLY BENEATH AN ANVIL OR OVERHANG, IS SIGNIFICANT.



SLIDE—WEATHER UPDATES—PMSV—FSS—ATC CENTERS

FREQUENT ENROUTE UPDATES, PARTICULARLY THROUGH MET WATCH ADVISORIES ARE HIGHLY RECOMMENDED. CENTERS ONLY BROADCAST SIGMETS WHEN ISSUED. THEREFORE, IF YOU ENTER ANOTHER CENTER'S AIRSPACE, YOU MAY NOT RECEIVE AN UPDATE ON PREVIOUS SIGMETS ISSUED IN THEIR AREA. YOU CAN OBTAIN UPDATES THROUGH ANY OF THESE AGENCIES, BUT THE MOST UNDER-USED FACILITY BY MILITARY AIRCREWS IS FLIGHT SERVICE.

SLIDE—SUMMARY

THE REASON FOR THIS MISHAP WAS THE CREW'S RELIANCE ON 10 NM SEPARATION TO ENSURE FLIGHT SAFETY.` IN MOST CASES, 55-SERIES CRITERIA PROVIDE ADEQUATE SEPARATION. HOWEVER, SEVERE THUNDERSTORMS WARRANT ADDITIONAL CONSIDERATION BASED ON RADAR RETURN STRENGTH, FRONTAL MOVEMENTS, ALTITUDE WINDS, AND AIRPLANE POSITION RELATIVE TO THE STORM. IT'S A JUDGMENT CALL ONLY THE AIRCREW CAN MAKE IN A SPECIFIC SITUATION. THUNDERSTORMS CONTAIN MANY FLIGHT HAZARDS: WIND GUSTS, SEVERE TURBULENCE, LIGHTNING, ICING, AND HEAVY PRECIPITATION. KNOWLEDGE OF THUNDERSTORM HAZARDS, AVOIDANCE TECHNIQUES, AND APPLICATION OF GOOD JUDGMENT CAN MINIMIZE RISK TO AIRPLANE AND CREW."

The Final Few

The last few seconds are the most important . . .

By Maj. Thomas C. Weinzierl
Supervising Editor

MAC crewmembers spend hours before each flight planning routes, computing fuel loads, checking weather at destination and alternates, and examining approaches, airfield diagrams, obstacles, and takeoff data. But when you're on short final and the color of everything outside matches your white knuckles, the whole mission often boils down to the transition from instrument to contact flight conditions—the final few seconds. Understanding the physiology and psychology of those precious few seconds is a vital part of each crewmember's knowledge, especially now that we're entering the winter season in most of MAC's operational area.

As we said, every successful approach and landing in marginal weather begins with thorough preflight planning. Checking NOTAMs, forecast weather, winds, and your destination's and alternate's runway conditions will help determine the runway conditions and type approach to expect. The instrument approach plate presents not only the opportunity to study the approach and minimums but also runway layout, obstructions, and type of lighting.

Now is the time to form a mental picture of the airfield layout as well as location of prominent landmarks. Be familiar with types of lighting installed on the expected landing runway. Note distance to the airfield from NAVAIDs. There just isn't any substitute for knowing what to expect during that short but vital transition to contact conditions.

The transition from instrument to contact flight conditions varies with each approach. Distinct transitions during obscured weather are rare. Obscured conditions present you with a number of problems not encountered when flying an approach through a defined ceiling. When the aircraft breaks out below a ceiling, visual cues used to control the aircraft are usually clear and distinct; there is a nearly instantaneous recognition of aircraft position in relation to the runway. With obscured or partially-obscured conditions, the reverse is usually true; visual cues are

indistinct and it's difficult to determine your aircraft's lateral and vertical position in relation to the runway. Consider factors bearing on the final stages of an approach and landing: visibility, type of weather, expected visual cues, and crew procedures and coordination. Preparation and understanding of weather and how it affects availability and use of visual cues are two of the most essential factors that help you transition safely. A look at specific conditions you can expect during this phase of a mission will give you a clearer view of the problem.

When flying a straight-in approach in VMC, the pilot has a plethora of unlimited peripheral visual cues available for perceiving depth, vertical position, and motion. However, even on clear days, varying, not knowing runway length and width can lead to erroneous perceptions of aircraft height above the runway. A relatively wide runway may give the illusion the aircraft is below a normal glide path; conversely, a relatively narrow runway may give the illusion of being high. If we understand the illusions under unlimited visibility conditions, it becomes easy to appreciate a pilot's problem when approach and runway lights are the only available visual cues.

Instrument approach lights do not provide adequate vertical guidance to the pilot during low visibility instrument approaches. In poor visibility, especially when the runway surface isn't visible, or in good visibility at night, there simply aren't enough visual cues to adequately determine vertical position or vertical motion. The sudden appearance of runway lights at or near minimums in limited visibility conditions often gives the pilot an illusion of being high. When approach lights become visible, pilots may tend to abandon established glidepath, ignore their flight instruments, and rely on poor visual cues. A similar situation occurs when a pilot flies into ground fog from above. If a pilot initially sees runway or approach lights, these cues tend to disappear as the airplane enters the fog bank. Loss of these visual cues often induces an illusion or sensation of climbing. These erroneous visual cues convince a pilot he is above normal glidepath and result in a pushover reaction, an increase in descent rate, and a short or hard landing.

Since approach lights are sighted close to the ground in limited visibility, an increased descent rate puts a pilot in a situation where there isn't enough time or altitude to prevent the inevitable.

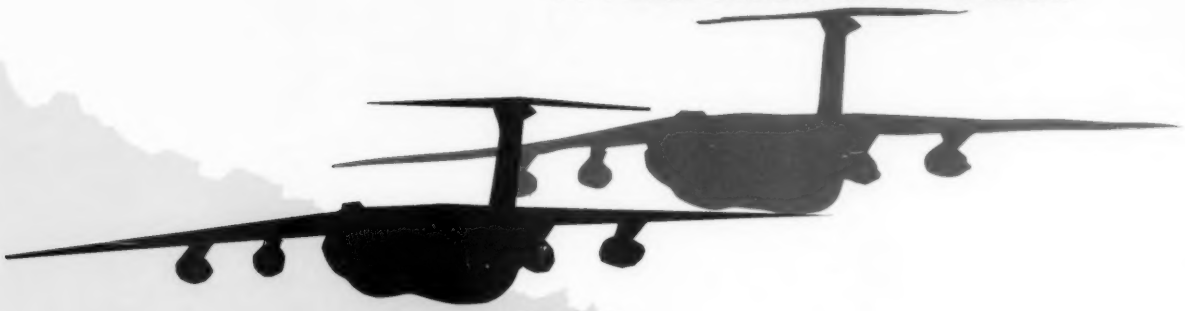
The only proven way to prevent a dangerously high descent rate and a short or hard landing is to maintain continuous crosscheck of the GSI or flight director and pay strict attention to PAR controller instructions as well as VVI and ADI indications. Establish predetermined descent rate limits when making low visibility approaches. Exceeding these limits should result in a go-around and missed approach. Visual cues can be deceiving, the pilot must continue cross-checking instruments and listening to the PAR controller's advisories even after runway and approach lights have come into view. Most pilots find it extremely difficult to continue to crosscheck flight instruments when transitioning to visual conditions; their natural tendency is to believe the accuracy of what they're seeing, or they continue to look outside to gain more visual cues. To avoid this natural tendency, incorporate a scan for outside references into your cross-check early in the approach even though visibility restrictions prevent actually seeing any. This will make you keep coming "back inside" to cross reference the GSI and VVI even when approach lights and other visual cues come into view.

Many phenomena, such as rain, smoke, snow, and haze may restrict visibility. The sky is considered totally obscured when surface visibility restrictions exist and the sky or clouds are totally hidden from the observer. If you're executing an approach in obscured conditions, you won't normally see approach lights or runway environment as you pass through the obscured ceiling. You should be able to see the ground directly below; however, transition from instrument to visual flight will occur at an altitude considerably lower than reported ceiling. In partially obscured conditions, vertical visibility isn't reported since the ground observer can see the sky through the obscuration. When clouds are visible with a partial obscuration, you'll get reports on their heights and sky coverage. Sky coverage (in 10ths) of the sky or clouds obscured by a partial obscuration is included in the remarks sections of weather reports. Although this may help clarify reported conditions in many cases, it still does not tell you the height at which you'll receive visual cues or of slant range visibility. In some cases, partial obscuration can be associated with shallow patchy fog, so you can expect to lose visual reference when you enter the fog. Also of concern is the visual range at which you will be able to discern visual cues for runway alignment and flare. Remember, reported runway visibility (RV) or runway visual range (RVR) may not be representative of the range at which you'll actually sight the runway. In fact, slant range visibility may be *considerably* less than reported RVR.

Flying a low visibility approach takes planning, awareness, and knowledge of the hazards involved. Fatigue, after a long duty day, added to a lack in any of these areas can add up to a deadly combination. The last few seconds are the most important, be ready for them.

The Right Choice

. . . Can Mean Life or Death.



The first indication of a problem occurred about one hour after takeoff. The captain's altimeter indicated a descent while the first officer's indicated a climb. The aircraft was in level flight with the auto-pilot and altitude hold engaged. After analyzing the situation, the captain determined his altimeter was reading correctly and disconnected the auto-pilot to begin a climb back to cruise altitude with reference to his altimeter.

Thus the crew believed the first officer's altimeter was malfunctioning. Both alternate and static sources were selected with no apparent change. The captain hand flew the aircraft, and maintained cruise altitude with reference to his altimeter, while the first officer's altimeter continued to climb. The captain had to continually apply more power to maintain altitude until max continuous power was reached. At this point the indicated airspeed started to decrease and the captain elected to start a descent.

The crew notified ATC they were unsure of their altitude or airspeed and requested assistance in locating a VFR airport. A nearby airport was clear and the flight vectored toward it in a very slow descent. As they approached the landing field, their altimeters and airspeed indicators began to appear more normal. A corporate aircraft joined the DC-9 to provide airspeed and altitude verification during the approach and landing.

Maintenance troubleshooting of the pitot static system revealed the air data computer (ADC) had internal leakage. Corrective action included replacing the ADC and completing a Barfield check of the pitot static system.

They concluded the first officer's altimeter and airspeed were reporting accurate information throughout the entire incident. The discrepancy between the captain's and first officer's instruments was most likely caused by the following: The captain's electric altimeter receives its information from the ADC. The same ADC provides the altitude readout signal downlinked to ATC. ATC advised the captain his altitude readout was correct. An erroneous signal from the ADC caused the captain's altimeter to read low. With autopilot on and altitude hold engaged, the airplane attempted to regain its original cruising altitude by climbing. This led to early indications on the first officer's altimeter of a 250 ft higher reading. After disengaging autopilot, the captain attempted to maintain cruise altitude with his altimeter, based on the assumption the first officer's altimeter was giving improper information. The captain probably continued to correct his altimeter, which was steadily descending because of erroneous signals from the air data computer; the aircraft continued to climb to an altitude higher than the assigned cruising altitude. The captain could not maintain cruise altitude airspeed because the aircraft had climbed to its maximum altitude capability.

(Editor's Note: How would you react in the same situation?)

Adapted From: *NW Airlines "On Course"*

From left: MSgt. James W. Warren, FE; Maj. Richard J. Casey, AC; Capt. John S. Gardner, Copilot; and Capt. Paul R. Leahey, Navigator. Not pictured: SSgt. Ricky C. Gehris.

Maj. Richard J. Casey and Crew, 37 TAS, Rhein-Main AB, Germany, were on a routine shuttle mission from Rhein-Main to Berlin. Their mission proceeded uneventfully until about 22 miles west of Berlin's Tempelhof Airport. Descending in IMC through 5,000 ft MSL on a radar vector for an ILS approach to Runway 27L, the copilot, Capt. John S. Gardner, alerted the crew to a fire in the cockpit. Flames were leaping from the top of his instrument panel near the bottom of his windscreen. Major Casey, the aircraft commander, immediately gave control of the aircraft to Captain Gardner while he donned his oxygen mask and directed all crewmembers do the same. Capt. Paul R. Leahey, the navigator, handed a fire extinguisher to the copilot to fight the flames. In the meantime, Major Casey resumed control of the airplane, declared an emergency with ATC, and requested immediate vectors from Berlin Approach for an ILS approach to Runway 09R. Suspecting the fire had originated in the Station Keeping Display Unit wiring, he also directed the radar be turned off.

A few minutes later, however, the flames reappeared. Captain Leahey retrieved another fire extinguisher and successfully fought the flames. In the meantime, MSgt. James W. Warren, FE, depressurized the aircraft and turned off the windshield heating system, suspecting it was the cause of the fire. The crew finally landed uneventfully. Investigation revealed the cause of the fire appeared to be the NESA windshield heating system. In all probability, an over amperage to the NESA bus bar overheated it and ignited the phenolic insulator and neoprene rubber boot that connect the power source to the window. Major Casey and crew displayed outstanding crew coordination and airmanship during this inflight emergency and their actions deserve the Excellence in Airmanship Award. Congratulations from *TMF*.

The Hazard of Being Outstanding

The tough part is staying that way.

(Editor's Note—The following article appeared in *Combat Crew* many years ago; however, the philosophy is just as appropriate today.)

One of the things you learn as an Air Force Inspector is the danger in being outstanding. This may seem paradoxical but it isn't. Without special attention to the hazards of outstanding performance, an individual, crew, or unit can fall into the fatal habits of complacency, carelessness, and overconfidence.

Athletic coaches know the deep-seated weakness of a team that is convinced it is great. There are a thousand stories told of outstanding teams that were "upset" because of overconfidence. But aside from the cost of losing, athletes also know there is a great danger in self-admiration. As one coach put it, "You only get hurt when you're loafing.

Loafing is sometimes easy to spot in outstanding units or crews. They do their jobs well, but with a certain casual ease that invites carelessness. While flying with such a crew, you hear a lot of loose chatter and joking on intercom when there should be strict attention to business. Checklists are covered in a fast monotone, forms are filled out correctly but are hard to read and sloppy. This kind of crew seems to think it has the system made.

Nothing could be further from the truth. Such a crew is actually inviting disaster. When a tragedy finally occurs, investigators may be surprised to find an error was made by a crew or individual which had always seemed perfect—had never made such a mistake before.

Once proficiency is achieved, even greater effort and attention are needed to stay proficient, without letdown, over an extended period. Such effort should be directed at doing more than physical repetition or simple practice. The greatest effort should be directed toward stimulating minds and building positive attitudes that will not permit complacency. In short, emphasis should be placed on air discipline.

Overtraining an individual to perform a task automatically is relatively easy. Through repetition, even the most complex task can be reduced to unconscious, mechanical actions. While one of the important objectives of any emergency procedures training program is produce overlearning, so response to an emergency will be immediate, such training is not intended to eliminate thought and judgment. It is, in fact, designed to give the crewman more time and opportunity for thought and judgment by making physical response almost automatic. A response totally devoid of thought invites a mishap. Nothing could be more dangerous or more destructive to air discipline.

More than mechanical ease in procedures or total recall of tech data, air discipline demands alertness. It demands we approach each action and procedure with total attention and seriousness. Mechanical response without attention is one of the most dangerous faults in flying.

Most pilots have a secret memory of a time when they looked at a switch or instrument without seeing it, or heard a checklist item being read and responded without thinking. Many have survived the experience of deviating from a flight plan, or ignoring a restriction or standing procedure. If they are professionals, they realize that only luck was on their side—not skill or intelligence.

Even though the need for an attitude of alertness and attention in aircrew discipline is particularly acute, there is a similar need for this attitude among maintenance specialists and supervisors at all levels. Flight operations are the peak of a pyramid of actions and decisions made by many people who may have no apparent relationship to the job in hand. Overconfidence or complacency at any point can have fatal consequences.

Avian Advice

Listen as our feathered-friends discuss HBs.

(Editor's Note—We've had a number of requests for reprints of the first installment of Tommy the Two-Fisted Zudzucker, *TMF's* resident generic bird. This being October, one of the two most active bird migration months, we decided to "adapt" the original article, updating some of the information and hopefully preserving portions originally found interesting/informative.)

Unlike feathered fliers, man's metallic bird-clones are very predictable—from our point of view, that is. Unfortunately, this doesn't help us avoid aircraft/fowl collisions.

Callously, in the wake of a collision, we're mostly concerned with the damage to our aircraft. The dollar value of birdstrike-induced damage is considerable. So, what can we "artificially aerodynamic" fliers *do* to eliminate or significantly reduce birdstrikes? First, let's look at it from the other side of the coin.

Birds must have *some* reason for selecting a particular airfield to loiter about. One theory suggests all they really want are basic creature comforts—food, water, and shelter. This leaves you with three options: eliminate bird attractants; harass the birds until they see it your way and leave, or tolerate the birds.

We managed to obtain, at virtually no cost, a transcript of Boring Barney, the Brown-Eared Bul Bul, interviewing Tommy the Two-Fisted Zudzucker, just recently arrived at Yore AFB. The zudzucker, a rare breed of bird, displays the collective traits of a very large number of birds—given the right circumstances.

* * *

"Hey, Tommy, what brings you to this area? After all, you zudzuckers never hung around here before. You were always camping out by the fish-and-brew emporium, if memory serves me."

"Haven't you heard? They started using that monouranium cyanide preservative in the aluminium foil and it's beginning to affect the soil. Personally, I don't have nothing against glowing feet, but when they start to dissolve, well . . . the ladies ain't too keen on it, if you know what I mean."

"That must be that stuff I've heard about code-named Avitrol. And you imagine these environs more suitable to your needs, right?"

"Well, Barney, we're not all that pretentious. We're just after the basics, that's all. This place has some very definite plus factors. Not as good as the fish-and-brew, but tolerable."

"Could you spell out a few of your *basic* needs? Which things, specifically, helped you determine this area amicable to your lifestyles?"

"Pretty impertinent there, Barn, but I guess it won't hurt to enlighten you. First of all, you've got that continuous canopy created by the trees over in the replanted areas . . . ."

"Ah, yes. You refer to the trees planted close together as seedlings which intermingle as they mature. The continuous canopy thus created is ideal for shelter, food, and nesting. This kind of landscaping joins shrubs, ornamental trees, shelterbelts, and noise suppression barriers as good avian habitats."

"Wrong, Bacon Beak, and don't interrupt! You're describing my Malibu condo. That leaf canopy serves a real function—it's a wicked backdrop for a strobe. You've also got all your berry-producing bushes here which . . ."

"Edge effects, of course. I should have remembered. Areas where vegetation changes abruptly from forest to brush, or brush to grass are very popular. They provide a variety of foods and attract myriad genera-including birds like yourself. Indeed, these areas are havens."

"Not so quick, Nodule Nose. The berries serve a very real need. They provide the ink to produce the tie-dyed ankle tags so popular this year. There's more, of course. Take all this standing water—critical."

"Naturally! One of our most important needs. Standing water serves as a veritable food mill, a breeding place for insects of every description, along with amphibians and other food sources."

"Wrong again, Bug Breath. You really must do

something about your diet, yuck! As the saying goes: it's the water. A key ingredient for producing quality libations. Fortunately, the nearby grainfields provide us with all the grain we need to keep production up. And don't buy off on any of that nonsense about us eating their grain. We're not health food fanatics. There's nothing like kicking back with a couple of cool 'toenail curlers' straight out of our 'starling still.' We're talking reality here!"

"Is there more?"

"Now that you mention it, yes. Check out the grass around here; they keep it cropped pretty short, especially around that huge flat black area."

"They call it a runway."

"I thought it was for mass-producing worm jerky."

"Help me with this. I'm guessing short grass affords the flock a certain security when feeding on easily found insects and rodents. Danger signals are easily transmitted, and the seed heads are delicious."

"I'm beginning to think more than just your bones are hollow, Barney. I'm talking about the ideal location for the annual strut-'n'crow competition. The seeds found on the long grass make good beads for the necessary dance accessories. And the short grass? How can you run a respectable contest if the crowd can't see the contestants?"

"I see your point. I presume the landfill areas were also a strong point in your decision, what with all the readily available food?"

"You trash me out, boy! That human refuse is of no culinary value to me, no sir. But just like any other civilized culture, we need a place to dump our synthetics."

"Well, what about all the rodents available for . . ."

"Cheap transportation. We can live without them, but the kids find it quite amusing to hop a ride on a field mouse."

"Anything else?"

"One last perk. There are ample isolated trees scattered about."

"Good nesting for the predator in us all, eh? Trees different from those in the neighboring community make great roosts."

"I'm beginning to see why they call you 'Brown-Eared.' No, son, every man needs a little privacy once in a while, if you know what I mean."

"Well, er, ah, yeah sure. Moving right along, are there any factors which discouraged your flocks in any way from settling in this area?"

"Well, they got this one particular breed of HB (that's human being to you) they call a Fizzo, I think. He's got all these wild ideas that are a great trouble to us." *(Editor's Note:* That's FSO—Flight Safety Officer—to us mortals).

"For example?"

"Well, he's trying to get these funny looking carts out here that cut the grass to a frustrating 8-12 inches, too short for the beads to grow, and too long for the dance— very irritating. He also takes quite a bit of pride in yanking out all the brush and weeds where me and Sally used to go every once in a while; "course I still had the isolated trees, for a while."

"What happened?"

"This large herd of HBs came out making an awful racket and cut off all the good limbs, they even removed some of the trees so our backdrop lets in all this light. They're virtually useless now."

"You still have the water."

"Naw, they come out and spray some powerful bad tasting stuff in the pools, even the bugs can't hack it. You can imagine what it does to the 'toenail curlers.' Rot yer beak right off!"

"That's tough. Still, I imagine these changes have been pretty slow and probably aren't permanent, right?"

"Slow, all right, but I'm afraid these kinds of changes last quite a while. Besides, even before they can get all these things done, they harass us."

"How?"

"Well, one time me and the boys were sitting around watching Slim do the limbo under this thick branch, when all of a sudden, the HBs start firing off these guns!"

"Pyrotechnics, huh? That's pretty scary."

"Yeah, it took three of us to pry Slim's beak out of that limb. Then there was the day we all flew off to the 'Emporium' for a kind of reunion. When we got back, there was bodies laying everywhere. Ghastly, I tell you. Took us more than two days to figure

out they weren't real. Looked like one of those disgusting taxidermist's shops. They used a similar technique on 'The Sweet Spot,' another favorite dive. We show' up one day, and here's all these hawks, falcons, owls, and even snakes! Good thing ol' Charlie's an expert on synthetics, or we'd probably never have gone there again. It's nerve racking."

"Sounds pretty severe."

"I guess. But the worst of all was psy ops."

"Psychological warfare?"

"Yeah, human brain. They come sneaking up real slow, as if we couldn't see 'em in that goofy looking truck with the big ears, and start playing these grisly songs of other birds dying! I was okay, then they switched over and started playing one that . . . I swear it sounded just like Aunt Martha screaming! Still chokes me up. What do you suppose drives them to these extremes? I mean, in a sense they fly just like us. Though I never could figure out why those aluminum birds have to scream the whole time. Sounds like it hurts 'em to fly."

"So, what do you think you'll do? Stick it out?"

"For a while, I guess. But if they continue, they'll mess up all the things we thought were so attractive in the first place, and we'll have to move on. Their loss really."

"Well, thanks for taking the time to chat with me. I really appreciate another intelligent view on these important sociological matters."

"What do you mean 'another,' Sponge Head?"

***

As you can see from this deep, revealing conversation, there *are* things we can do to solve our problems with birds. The most effective of these are passive actions, which include grass height management, edge effect control, landscaping management, controlled reforestation, standing water control, and pest control. Bird harassment techniques are effective, but only for a limited time. These "active controls" include the use of pyrotechnics, gas cylinders, bioacoustics, and scarecrow/model displays.

Birdstrikes constitute a considerable threat to aircraft in flight, and bird control/elimination is one key to the solution. Unfortunately, the methods are not quick or easy, so even if the bird problem is not overwhelming at your base now, you need a plan to meet the problem, should it arise. If you find you have a seemingly overwhelming problem, call the AF Bird-Busters—The BASH team. Officially known as HQ USAF/LEEV, you can reach them at AV 970-6240/6242. Or you can reach them via mail (or carrier pigeon) at:

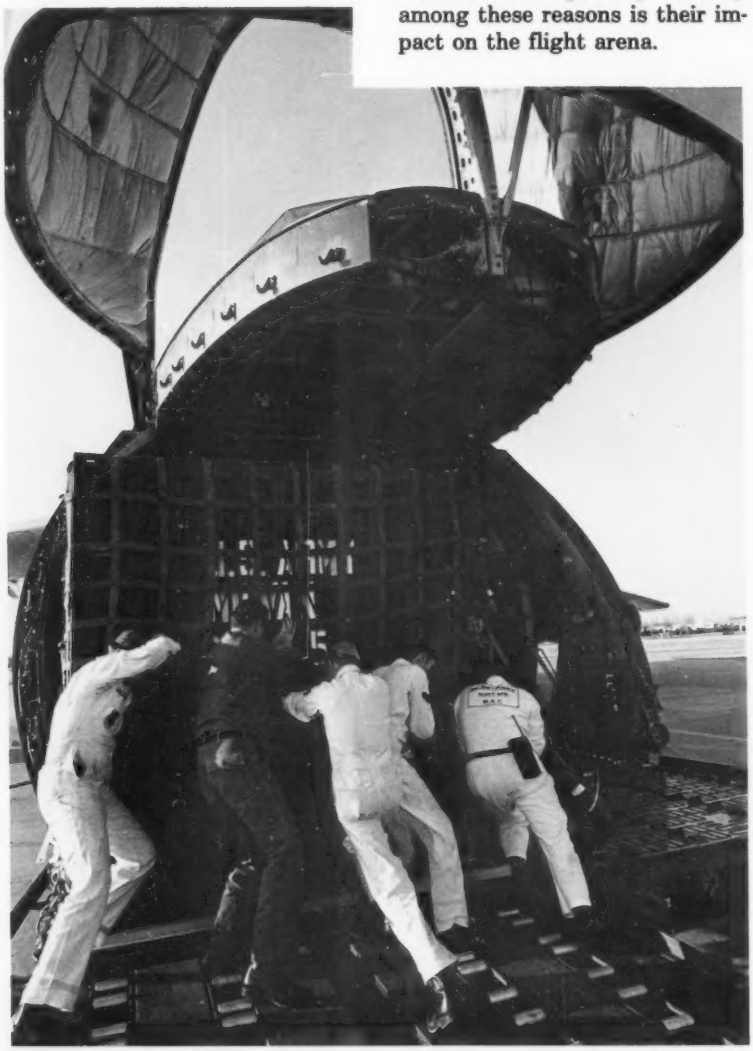
BASH TEAM
HQ USAF/LEEV
BOLLING AFB. D.C. 20332-5000

Tomorrow may bring a new challenge. Remember, the early bird gets the worm. Yummy!!!

Safety Workhorse—The FSO

Well, here we are, 10/12s through this series of articles, having fun and learning while preparing each installment. We hope you're doing the same while reading them. This time our spine-tingling edition won't require supplemental reading, so just follow along. We will detail some thoughts on how and why different safety disciplines interconnect.

As an FSO, your *primary* responsibility is in the flight arena (hence the catchy job title), but for a complete safety program, you need to get involved with the spectrum of safety concerns or your program will be quite shallow. There are a number of reasons a flight safety officer should know about ground safety, explosives safety, and nuclear surety in addition to his own specialty. Primary among these reasons is their impact on the flight arena.



By Lt. Col. Michael G. May and
Capt. Donald L. Rosenberry

As FSOs, you're accustomed to hearing aircrew members discussing their relative worth measured by the cumulative number of hours they've spent doing their job. While this concept might seem a bit odd to the 9-5 worker who's more accustomed to measuring performance by the year, we readily accept flight hours. The sad truth, however, is we majestic aviators spend a disproportionate amount of time in earthbound pursuits. This alone draws the FSO into another realm of safety appropriately titled "Ground Safety." After all, what an aviator does on the ground may affect his/her performance in flight. A crewmember injured on the ground has a diminished capability in everything he/she does—including flight. But this isn't the only reason to concern yourself with ground issues.

If you're in safety and the boss needs a safety answer, he'll likely ask *you*. Naturally, we aren't suggesting you should be as prepared to handle ground safety requirements as your unit's ground safety officer, but you should be familiar enough to help in a crisis, at least to know where to look for answers. Everything from self-medicating, airfield criteria waivers, and ramp inspections to preventing heat exhaustion are parts of flight and ground safety programs. It does make flight safety a bit more complex—and we're still not through.

How about those things that go boom in the day/night? Yes, explosives safety has a decided impact on flight operations. Certainly there is a much larger non-flight world the explosives safety manager must deal with, but flight is definitely a part. How does this affect crewmembers? In a variety of ways. From the types of loads we carry (compatibility criterion) to where we park the aircraft, to how we handle in-flight emergencies, to where we can land, explosives cargo has an important impact on the MAC mission. As a flight safety officer, you need to know the basics to keep the system working. You're often in a position to provide information on correct explosives handling to the crews, controllers, loaders, and planners. Again, we're not suggesting you supplant the explosives safety officer, but you need to have some basic knowledge and know where to find the rest. Since the explosives safety position is normally one-deep, the "opportunity to excel" in this area is not just a remote possibility. In addition to the normal concerns of your base, you have to consider exercises which take you and your unit to remote areas not subject to the explosives safety officer's careful scrutiny. It's in this environment you're most likely to have a problem, and least likely to have someone near to help when questions or problems arise.

Nuclear surety. It's always a sobering thought and affects all of us. Even if your unit doesn't have a routine nuclear mission, you have nuclear surety concerns. In

fact, if your unit is rarely involved with nuclear surety concerns (maybe only during inspections) it's even more important to know what you need. You may very well be the only source of information—trying to learn when you need to know isn't healthy. Your involvement may center around nuclear certified equipment, or run the spectrum to PRP, but it's an area you must be familiar with if you intend to run a good program. Your goal is to support the commander in executing a quality safety program, you can bet he/she is concerned with every one of these areas, especially when a question arises.

So, how do we recommend you arm yourself with this information? First, we hope we've shared a starting point for each in this series. Obviously, that means regulations, which hold a wealth of information. Too much to process you say? We agree. We wouldn't think of suggesting you attempt to assimilate all OSHA or AFOSH guidance; by the time you develop a working knowledge of all the written guidance for all those areas, you could retire. Likewise, we're not suggesting you're not a functional safety officer until you can answer all the questions that come up about everything dealing with safety—far from it. We don't think there are *any* safety professionals who'd claim that prowess. What we are suggesting is you glean from the professionals you work with, those areas which impact your primary business most often. You might find it informative to know where the requirements for working on the flightline are found (i.e. no rings, don't walk through prop arcs, reflective gear at night— even for invincible crewmembers). It might be handy to know where you can find requirements for grounding and parking an aircraft with or without hazardous cargo, what constitutes hazardous cargo, precautions needed for servicing aircraft, and other bits and pieces from every safety field which impact the way we fly. Another area, which doesn't fit neatly into any of the categories, is contingency plans. This frequently overlooked area can have serious impact on your mission and, therefore, your safety program. Much of this will come to you piecemeal through experience, but that's a lot like learning emergency procedures as they happen to you. You can help the process a lot by actively pursuing information. We've seen some innovative methods which expand the FSO's cache of information.

One technique we've seen puts a safety officer in the observer role *with* the ground safety officer (GSO), explosives safety officer (ESO), or nuclear surety officer (NSO), as they perform inspections, staff assistance visits, and mishap investigations. Naturally this requires an efficiently run office, but we know yours is right on top of things. Seriously, the time spent accompanying the GSO on a facilities inspection, especially if it involves aircraft maintenance, transportation, or the flightline, is very valuable. But lest we be accused of shortchanging the "routine" non-flight areas, those inspections are invaluable. They exercise the investigative, inspection, or staff assistance process, and provide a different perspective on safety. There's an added benefit to FSOs accompanying the other professionals—it builds credibility into your overall program.

The concept you want everyone in the unit to adopt is "safety impacts every facet of operations," from starting engines to waterskiing on weekends. Aircrew members have no difficulty with "safety belt, shoulder harness—fastened and locked" but can be tough to convince to wear a helmet on their motorcycle or seatbelt in their POV. It's all in the way we've been trained. Safety offices need to be cohesive units, instead of several groups of experts operating independently. If flight squadrons only see the wing GSO once a year during the facilities inspection, they won't relate to him/her very well, and the same is true for you. If the engine shop folks only see the FSO when said FSO needs information on a failed engine, he's not likely to be a credible source of safety information to them. This really stifles a safety program. A safety office of three, working together and developing a synergistic effort, can be more effective than one twice the size working at odds.

The first step to developing a great working relationship falls in collocating all safety functions. This isn't just a technical concept, it has a real purpose. Crosstell gained just from juxtaposition would require tons of inter-office memos to duplicate, if possible at all. The ability to freely intercommunicate revolves around a comfortable relationship between agencies which is unlikely to develop with safety expertise located in separate buildings. Sometimes it can't be helped. In those cases, it's even more important you recognize the handicap and actively pursue corrective action. Remember, we separate safety into disciplines to develop continuity, expertise, and maintain a manageable program. The real world isn't separated that way, especially when it comes to flying. Trying to force our man-made modular approach to safety on real situations is dangerous and represents a major obstacle to running an effective safety program. The goal is an effective *flight* safety program, the means is to build a program of total safety: ground, flight, explosives, and nuclear awareness.

New High Altitude Charts

Pilots who use high altitude routes (18,000 ft MSL and above) will be pleased to know the long-awaited revision of FAA's IFR Enroute High Altitude chart series is complete. The new version for Alaska became effective 24 September 1987, and will be effective in the lower 48 states 21 November. The Defense Mapping Agency high altitude charts which serve Hawaii are expected to adapt to the new FAA format in the near future.

The new formats reflect comments and suggestions from airspace users initiated during the National Airspace Review in 1982 when problems of readability, especially in high traffic areas, were cited by many pilots. The increase in parallel traffic airways, which took place in February of this year as part of the East Coast Plan for more efficient traffic flow, added to chart congestion. In fact, in order to introduce the new East Coast route structure, the FAA had to supplement the "H-6" chart.

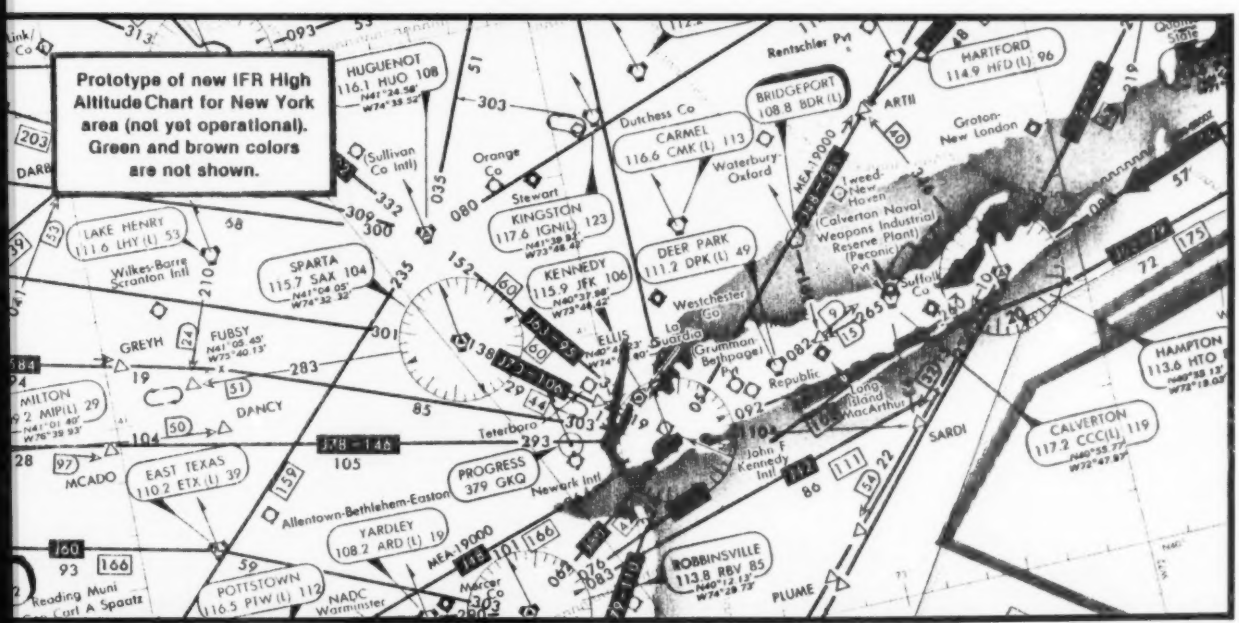
The new charts include reconfiguration of symbols and colors as well as an improved depiction of routes and scale expansion. The four charts for the lower 48 are being replaced by six charts with a scale almost 25 percent greater. The new chart for the eastern seaboard "strip" section is on a scale of 1' to 18 nm , thus eliminating the present East Cost "H-3" supplement.

Greater legibility is achieved not only by improved typography but also by better color use and contrast. Black is used for jet routes and associated route designators; brown for oceanic and other special routes. Blue is used to show special use airspace, air route traffic control center boundaries, and airports with approaches described in DOD FLIP publications. A fourth color, green, depicts shorelines and airports with civilian instrument approach procedures.

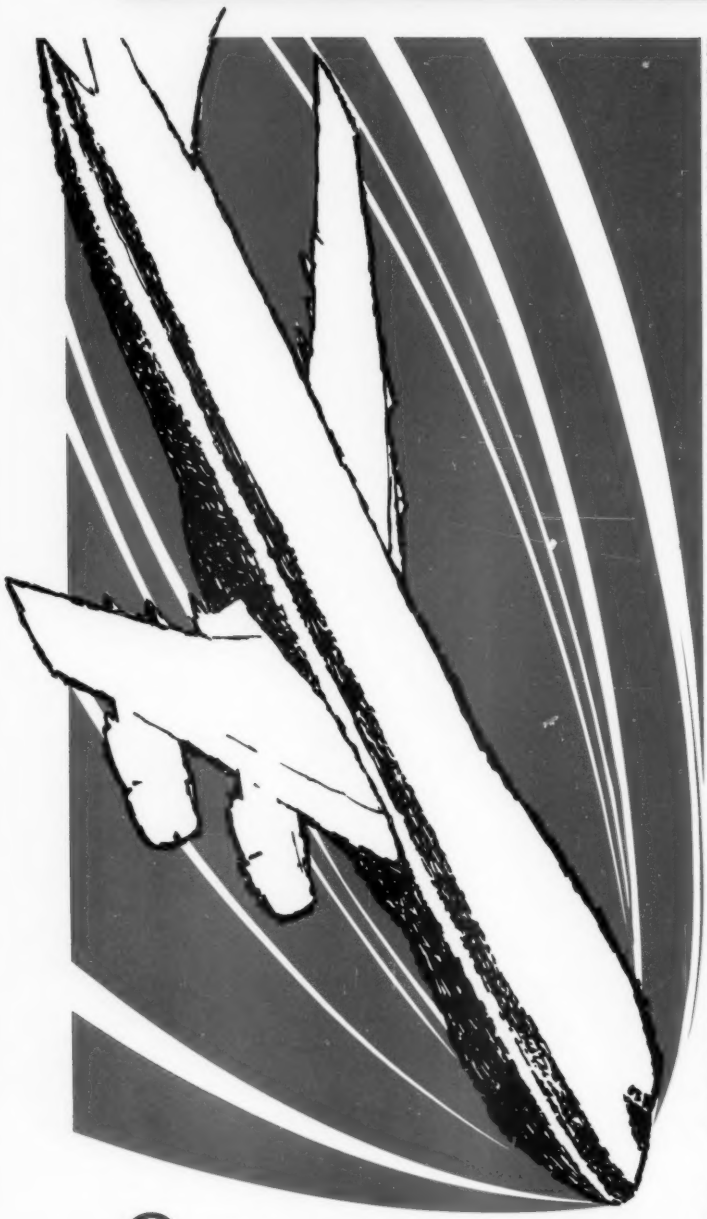
The prototype of the new charts (below) has been tested operationally by military pilots, with enthusiastic approval for its overall ease of use and readability. Finalized charts will be shipped to chart sales agents or directly to subscribers approximately one week in advance of the effective use date. They are published by the National Ocean Service (NOS) and may be obtained from the NOS Distribution Branch, (N/CG33), Riverdale, MD 20737.

Work is under way to revise the Low Altitude Enroute series as well as Sectional, Terminal Area, and Instrument Approach Procedures Charts. Opportunities for public comment on these revisions will be reported as they become available.

Adapted from: *FAAviation News*



Unusual Attitude



Over the years, a number of jet aircraft accidents and incidents resulted from flightcrew inability to properly recover from unusual attitudes. In all cases studied, the unusual attitude was induced by irregularities such as turbulence, engine malfunction, flight control malfunction, and instrument failure. What followed were inappropriate control inputs, further aggravating the condition until either the airplane was lost or, rarely, control regained—often in a manner difficult for the crew to describe later.

This article is a review of jet aircraft unusual attitude recovery techniques, bearing in mind appropriate use of thrust and controls at the onset of an abnormal flight condition should prevent an unusual attitude from occurring.

In general, recovery techniques should be compatible with the unusual attitude's severity and altitude available for recovery. Unusual attitude recoveries shouldn't be confused with pre-stall buffeting or stick shaker activation in normal attitudes, which generally require relatively small pitch and roll adjustments and go-around thrust application.

Recognition and Recovery

The first step in unusual attitude recovery is recognition. Normally, the attitude indicator is the primary means of discovery, but to prevent aggravating or even inducing an unusual attitude as the result of a malfunctioning display, you should crosscheck the other pilot's attitude indicator as well as the standby attitude indicator, airspeed, heading, and altitude. Then, having confirmed the condition's attitude and dynamics, methodically begin recovering. The goal is to smoothly return to normal flight without stalling or exceeding engine or airframe limits.

In extreme cases, such as the China Air 747SP incident in February 1985, continuous roll and pitch changes can make attitude indicator interpretation difficult. The standby attitude indicator, although useful as a "voting instrument" in confirming other displays, is difficult to interpret in extreme, dynamic conditions because of its small display and should be used only as a last resort attitude indicator in unusual attitude recoveries.

Use the attitude indicator roll index as a "sky pointer," it always points straight up and should be in the upper half of the attitude display. Roll in the shortest direction toward the sky pointer.

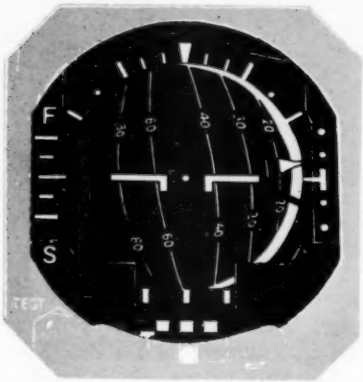
The following basic unusual attitude recovery principles apply to any conventionally-configured jet aircraft.

Recovery Techniques

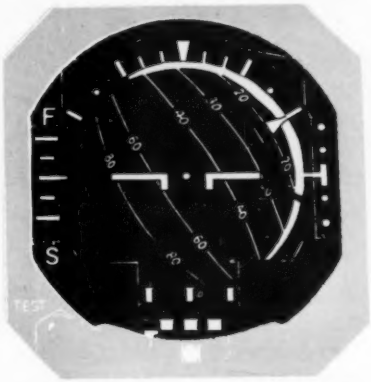
Nose-Down High Airspeed

In dives, bank elimination aids pitch control. Throttles should be smoothly—but not too rapidly—retarded to idle and speed brakes extended. Avoid rapid throttle movement; it could stall the engines and with underslung wing pod engines, rapid thrust reductions could appreciably contribute to pitch-down tendencies. Roll wings level, then pull up; don't do both at once. Rolling pullouts sharply increase airframe stress.

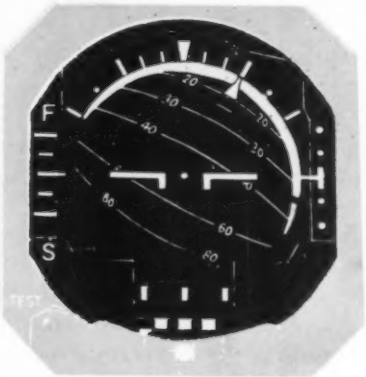
At high Mach, shock waves on elevators might limit their effectiveness. If the airplane doesn't respond to the elevators, unload the controls and judicially trim the stabilizer. Avoid overtrimming which could cause an attitude overshoot leading to a nose-high low airspeed unusual attitude. As you approach normal flight conditions, retract speed brakes and confirm normal engine indications and response since engine stalls and flameouts can occur because of distorted airflow over engine inlets.



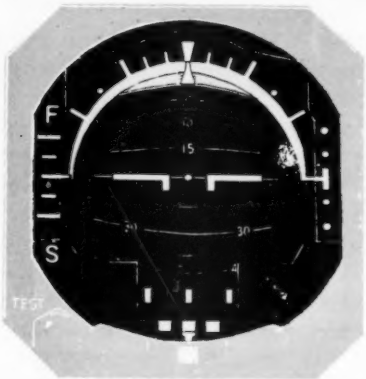
1. In nose-down high-airspeed unusual attitudes, roll out to wings level before pulling up. In extreme nose-down steep-bank attitudes, the horizon may be difficult to find. The sky pointer always points straight up. Smoothly retard the throttles and deploy speed brakes to limit drive speed.



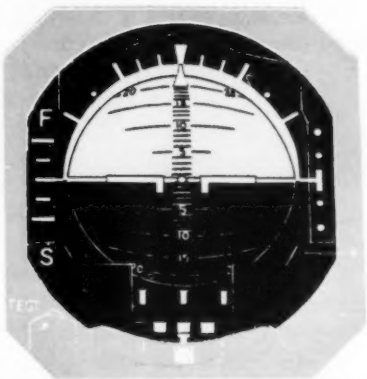
2. Begin rolling out toward the sky pointer.



3. Continue rolling out until reaching zero angle of bank.



4. Smoothly pull-up to the horizon.



5. After achieving straight and level flight and normal flying speed, retract speed brakes and reset thrust.

Nose-High Low Airspeed

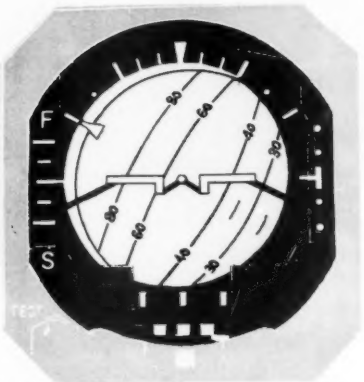
In general, if sufficient elevator authority exists, lower the nose enough to regain safe flying speed while applying go-around thrust. At normal jet cruising levels, engine thrust will be insufficient to accelerate from a low-speed condition; you'll have to trade altitude for airspeed.

In extreme nose-high, low airspeed unusual attitudes, bank aids pitch control. That is, you can retain appreciable bank while the airplane's nose is brought down through the horizon in an airspeed-gaining maneuver. However, under such circumstances, it's vital the airplane remain in coordinated flight (ball or sideslip index in the center) with the control wheel positioned in a manner to either retain or, ideally, decrease wing angle of attack. Don't apply any back pressure which could induce an accelerated stall, and watch out for skids or slips which could quickly induce a spin.

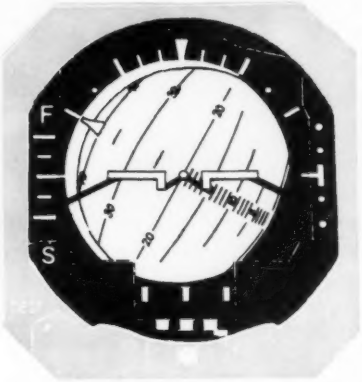
When you've regained safe flying speed as the airplane descends nose-down, roll wings level, then pull up to the horizon.

Check for normal engine indications, throttle response and warnings and reset thrust for normal flight.

Adapted From: *Flight Operations/Pan American Airways*

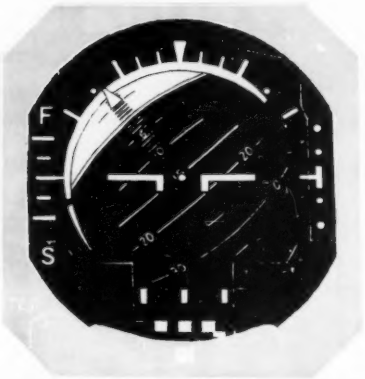


1. Bank aids pitch control in nose-high low-airspeed unusual attitude recoveries.

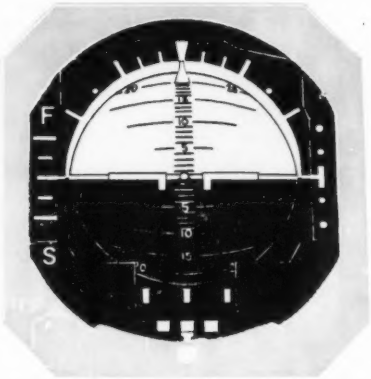


2. Bank is retained, and while remaining in coordinated flight, the nose is brought down toward the horizon.

3. Bring the nose down toward a point below the horizon where airspeed can be rapidly regained without requiring excessive pullout forces.



4. As safe flying speed is regained with the nose sufficiently below the horizon, begin rolling out.



5. After rolling wings level, reset pitch near the horizon and reset thrust.

Flying-Hour Milestones

10,000

CMSgt. Kenneth F. Thompson, 4 MAS
MSgt. Elmore Jackson, Jr., 701 MAS
MSgt. Gail H. Meyer, 57 MAS

5,000

Lt. Col. Paul R. Harwood, Det 2, 1401 MAS
Lt. Col. Ben E. Josey, Det 5, 1400 MAS
Lt. Col. Franz E. Nelsson, 4 MAS
Maj. Harold H. Bearden, 312 MAS
Maj. Philip C. Blackburn, 312 MAS
Maj. William Finlinson, 312 MAS
Maj. John A. Messerly, 56 MAS
Maj. Michael S. Ross, 312 MAS
Maj. William F. Rusher, 312 MAS
Maj. William R. Venemon, 4 MAS
Capt. Taylor M. Tarvin, 41 MAS
CMSgt. William J. Evon, 21 AF
SMSgt. Michael C. Mohrbacher, 1551 FTS
MSgt. William E. Camplain, 50 TAS
MSgt. Chester Collier, 41 MAS
MSgt. Joseph Galetta, 6 MAS
MSgt. Dain C. Hansen, 4 MAS
MSgt. Bernard W. Haughey, 6 MAS
MSgt. Charles L. Miller, 4 MAS
TSgt. David V. Brown, 36 TAS
TSgt. Benhard J. Nesheim, 4 MAS
TSgt. Thomas B. Saucier, 4 MAS
TSgt. Brian W. Summ, 4 MAS
SSgt. James B. Hamilton, 375 AAW
SSgt. Richard A. Haughian, 4 MAS
SSgt. George L. McDougal, 4 MAS

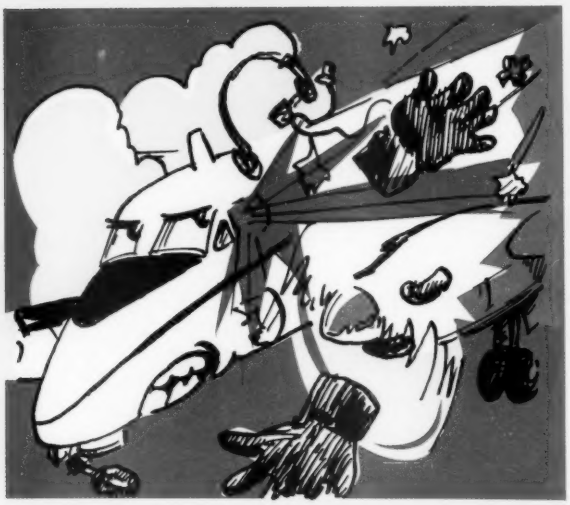
2,500

MSgt. Warren C. Allshouse, Det 1, 1 SOW

Ranks and units are those at time of award.
See MACR 900-3 for details on how to apply for your own milestone award. ✯

QUICKSTOPPERS

GLASS SO CLEAN, YOU'D SWEAR IT'S NOT THERE

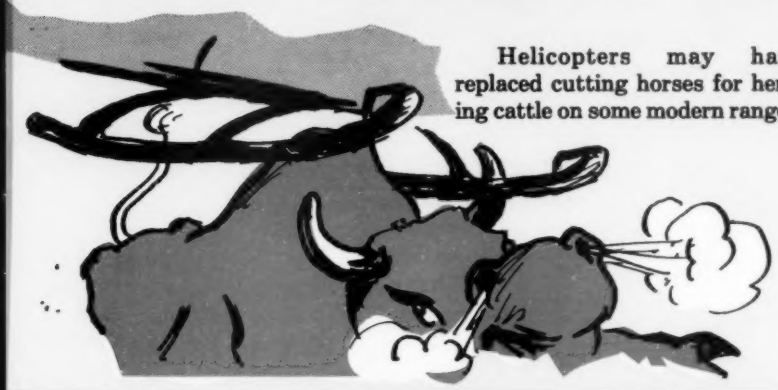


The C-12F was climbing thru FL 220, autopilot engaged, when suddenly the pilot's side window exploded, causing rapid decompression. The aircraft commander immediately donned his oxygen mask, took control of the aircraft, and initiated an emergency descent. To make matters worse, during decompression the pilot's headset departed its assigned position and exited the window along with his nomex gloves. The copilot declared an emergency and manually deployed passengers' oxygen masks. Descent and landing were uneventful. Investigation revealed use of abrasive and harmful materials to clean and maintain the airplane's acrylic windows caused crazing to the point the window's structural integrity became marginal. Both windows were replaced with stretched acrylic windows which are stronger and more resistant to crazing and scratching. Industrial strength Windex anyone?

IMITATION "FUR COAT" ANYONE?

The operator of this 747 rejected a takeoff due to a fire-warning on the main deck. Troubleshooting showed all 16 fire detectors were contaminated with a yellow-brown dust. The fire detection sampling tubes were removed and cleaned. One tube contained a large quantity of unwelcome dust. Filters on avionic component cooling racks were found covered with a 1mm-thick coating of chicken feather particles. Makes sense—this 747 regularly transports live chickens. The operator is convinced the control cable contamination and dust were residuals from the live chickens. Better feathers than eggs, right?

HOLY COW. . . IT COULD BE . . . IT MIGHT BE . . . IT IS . . . !



Helicopters may have replaced cutting horses for herding cattle on some modern ranges, but not all livestock have adjusted to this type of handling. In one recent accident, an irritable steer was being driven back to the herd by a pilot in a Hughes 269C at low hover when suddenly the steer spun around, reared up, and hooked its horn on a skid. The helicopter pitched forward and struck the steer and sustained considerable damage. The pilot was not injured; the steer disappeared!

A MIND OF ITS OWN!

This C-130 was to fly from Cherry Point, North Carolina, to Little Rock AFB, Arkansas, with inboard main fuel tanks empty due to a fuel leak in the forward part of number 3 main fuel tank. All fuel needed for flight was distributed in numbers 1 and 4 main tanks and auxiliary and external fuel tanks. Numbers 2 and 3 engines were placed on cross-feed from the auxiliary and external fuel tanks for takeoff to maintain positive fuel pressure to the engines. The cross-feed fuel separation valve was open for takeoff. Shortly after takeoff, the RH external tank-empty light illuminated with 3,000 lbs of fuel indicated. When the external tank fuel boost pump was turned off and the circuit breakers pulled, the RH auxiliary tank-empty light and numbers 3 and 4 engine fuel-low-pressure warning lights flickered. The flight engineer verified the crossfeed separation valve was open insuring fuel for number 3. Further investigation revealed fuel dumping from both dump masts. The crew notified ATC of the emergency and started a turn to Cherry Point (avoiding populated areas). The aircraft landed after a 30-minute "uneventful" flight and a loss of 15,000 lbs of fuel—half of takeoff fuel load.

After a considerable meeting of the minds, the minds decided the ground transfer valve may have stuck in the "open" position. The valve appeared to stay open two out of the four times it was tested and the decision was made to fly the aircraft back to Little Rock (again with numbers 2 and 3 main tanks empty). The following sequence was planned: The auxiliary tanks would be used for crossfeeding engines 2 and 3 for takeoff and climb and the fuel separation valve opened for back-up in the event an auxiliary tank boost pump failed. The crew planned a transfer to the external tanks when the auxiliary tanks fuel level reached 4,500 pounds.

Departure was uneventful until 15,000 ft MSL when fuel crossfeed changed from auxiliary tanks to external tanks. Fuel began dumping from both auxiliary and external fuel tanks as soon as the flight engineer turned on the RH external fuel tank pump and opened the RH external crossfeed valve. The aircraft began another return trip to Cherry Point. At 14,000 ft MSL, the flight engineer isolated the problem by going back to auxiliary tank crossfeed, turning off external tank pumps, and closing external tank crossfeed valves.

At that point, all dumping ceased. Because of the 5,000-lb fuel loss, and unpredictable nature of the problem, the crew, once again, decided to abort the flight but diverted to Pope AFB, North Carolina, for expert C-130 maintenance assistance. Maintenance technicians discovered the right hand external dump valve had failed in the "open" position, and allowed fuel to dump as soon as a right external tank boost pump was turned on. Final determination was the RH external dump valve possibly failed in the open position during ground transfer operations.

HOW TIME FLIES!

Guess what folks? That very special time of year has come around once again. I know . . . I know . . . not possible you say? Already you say? Well, yes it has. The special, *the very special* 1988 MAC Flight Safety Writing Contest is beckoning.

Don't fight it! This is your BIG chance to make yourself heard—and maybe see your name and masterpiece in print—a golden opportunity to boost your ego and contribute something to safe flight operations. Let's hear from all of you—crewmembers, support folks, and the rest of you readers who enjoy reading the "*Flyer.*"

You'll receive a free one-year subscription to *TMF*—that's just for entering and following the rules below. If you win first, second, or third place, you'll receive a handsome desk set. The nine honorable mention winners will receive engraved wall plaques to attest to their literary prowess.

Come on—don't procrastinate—be one of the first to enter. Your personal deadline is 31 March 1988. Follow the rules below and let's hear from you.

THE RULES

The 1988 MAC Flight Safety Writing Contest is conducted according to MACR 900-3 and these rules. All entries must be original, unpublished and postmarked no later than 31 March 1988. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages). Poetry should be about 75 to 100 lines. Entries must contain an *aviation safety/mishap prevention message.* Manuscripts must be double-spaced, typed and submitted in two copies. Identify entries by title only and attach a cover sheet showing the author's name, address, duty phone number and unit. The cover sheet must contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free one-year subscription to *TMF.* However, contest prizes (desk sets and plaques) may only be awarded to military members and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a special category. All winning stories will be published in *TMF.* Entries should be addressed to:

Flight Safety Writing Contest
HQ MAC/IGFE
Scott AFB, IL 62225-5101

After Deadlines

THANKS—to an eagle-eyed reader who points out to our chagrin we highlighted an FAA announcement of a new minimum aircraft separation in the August 'After Deadlines' but neglected to actually include the new limits. The story should have read as follows: "FAA announces a change in radar separation limits during final approach. The new limit of 2½ miles has been in effect since 9 April 1987 and affects separation between aircraft on final approach inside the final approach fix. The change is from the minimum three-mile separation FAA has enforced for over 40 years. It does not apply to wet runway conditions as yet. FAA plans to collect and analyze wet runway data before implementing this procedure in wet runway environments. In addition, the new limit may be used only when operationally needed and approved by FAA Headquarters; leading aircraft weight class is the same or less than trailing aircraft; a runway occupancy time of less than 50 seconds is documented; Brite/TCDD displays are operational and used for quick glance reference; turnoff points are visible from the tower; and the runways are clear and dry. Heavy aircraft and Boeing 757s are excluded from this separation reduction.

A UH-60 BLACKHAWK—helicopter assigned to the 55th Aerospace Rescue and Recovery Squadron, Eglin AFB, Florida; crashed near Pope AFB, North Carolina, 14 Aug 1987, killing all four crewmembers on board. The aircraft was on training mission from Pope AFB to Andrews AFB, Maryland.

TWO "FIRSTS" FOR AN—all female crew from Charleston AFB, South Carolina, who received the top trophy at the International Air Tattoo airshow at RAF Fairford, England. The C-141 crew, commanded by Capt. Teresa M. Sullivan, was the first ever all-female crew participating in and winning the airshow. The trophy is presented for the most outstanding contribution to the aims and spirit of the meet. The aircrew took part in a ground competition related to ground and air operations. "The ground competition included a test of our skills in airdrop, aircraft recognition, small arms range firing and endurance on an assault type obstacle course," said Captain Sullivan.

A MILITARY AIRLIFT COMMAND—unit at Andersen AFB, Guam, is the recipient of this year's Air Force Association Verne Orr Award. The 54th Weather Reconnaissance Squadron—the lucky recipient—was recognized for its most effective use of people in accomplishing unit mission. The "typhoon chaser" unit consists of 11 crews and 6 aircraft. One of their most noteworthy accomplishments was a overnight deployment to Japan to track the Chernobyl disaster fallout, flying 74 percent of WC-130 sampling-mission hours. Well done!

☆ US GOVERNMENT PRINTING OFFICE: 1987 757-697

One Down, One to Go!

We're still looking for *ONE MORE* (we found one . . .) rated captain/junior major who stands out, in a professional sense of course, to fill *ONE* vacancy. A proud, clever, intelligent, efficient, well-spoken, creative and enthusiastic individual who possesses wonderful writing skills. You're right! We'll never find another such paragon so we'll settle for someone with half of those skills. Flight safety experience is a plus; a sense of humor required; modesty optional! Remember, a journalism or public affairs background *isn't* a requirement (although helpful). Review a few issues of *TMF* and you'll see how easy we make it seem.

Are you remotely interested? Please give Major Weinzierl, Supervising Editor, a call at AV 576-3534/5542.